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WSN Using Improved History Based Contention Window Scheme

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ABSTRACT
The earlier work described in the literature involves different schemes or algorithm that are implemented at the network layer or at the physical layer of TCP/IP to endorse energy saving so that the network of any system remains sustainable for long time. The techniques discussed in the thesis uses the history based contention window control over packet routing in the network layer. The main idea behind this scheme is to control the time of every node which delivers the packet but if in case the proximity node or network does not accept the incoming packets because it is busy, then the transmitter node has to either wait or it tries randomly to deliver the same. This causes the whole system to use more of its energy and this is the main reason that conventionally many other protocols are not good for the system. But our system and our history based contention window control scheme has proved to be worthy as it is good in terms of the time allocation providing the system either to wait or to access other node for the transmission of the system. The energy being consumed has reduced considerably and the efficiency and throughput has increased because of reduced energy consumption.

KEYWORDS: WSN, RTS, CSMA/CD, IEEE 802.11

INTRODUCTION:
The current cellular networks are classified as the infrastructure dependent networks. The path setup between two nodes is completed through the base station. Ad hoc wireless networks are capable of operating without the support of any fixed infrastructure. The absence of any central control system makes the routing complex compared to cellular networks. The path setup between two nodes in ad hoc network is done through intermediate nodes. For the distributive system to work the mobile nodes of ad hoc network are needed to be more complex than that of cellular networks.

HIDDEN TERMINAL PROBLEM:
Hidden nodes in a wireless network refer to nodes that are out of range of other nodes or a collection of nodes. Take a physical star topology with an access point with many nodes surrounding it in a circular fashion: Each node is within communication range of the AP, but the nodes cannot communicate with each other, as they do not have physical connection to each other. In a wireless network, it is likely that the node at the far edge of the access point's range, which is known as A, can see the access point, butit is unlikely that the same node can see a node on the opposite end of the access point’s range, B. These nodes are known as hidden. The problem is when nodes A and B start to send packets simultaneously to the access point. Since node A and B cannot sense the carrier, Carrier sense multiple access with collision avoidance (CSMA/CA) does network, and collisions occur, scrambling data. To overcome this problem, handshaking is implemented in conjunction with the CSMA/CA scheme In the basic transmission scheme due to the fact that carrier sensing range is almost equal to transmission range of a node, it effectively increases the probability of collisions. The problem of a station not being able to detect a potential

competitor for the medium because the competitor is too far away(based on their carrier sensing range) is called the hidden node problem.

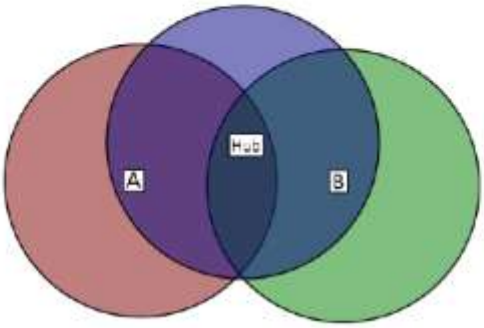


Figure 1: Hidden Terminal Problem

RESOURCE SELECTION:

We used an area of 1000_1000 square unit. We have done 2 different types of experiment. One of them runs for 1000 time units and another runs for 800 time unit For each experiment we created 5 network topologies and have taken the average of the 5 results. All the experiments were done using CBR traffic sources. The environment used was multi-hop with the presence of hidden node. We considered a static network. For traffic generation we have used an uniform packet size generator with min and max size specified for each experiment. We did experiments in three network conditions; lite (50 nodes), medium (75 nodes), dense (100 nodes). For performance measurement we have calculated the overall (aggregate) throughput of all the nodes.

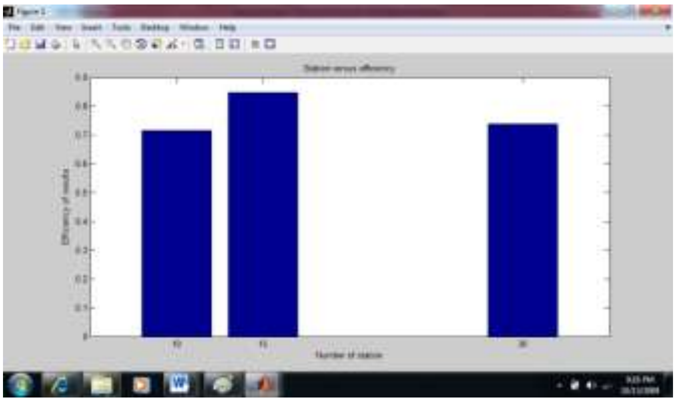
MATERIALS AND METHODS:

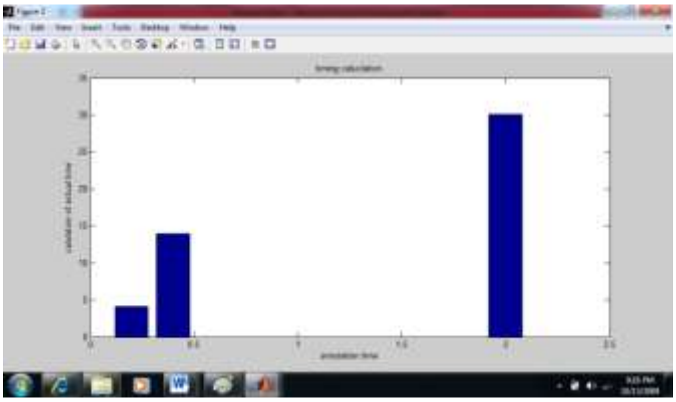
We propose a novel back-off mechanism, in which the history of packet lost is taken into account for CW size optimization. The packet lost involves packet collision and channel error. The mechanism checks the last three states of transmission, and optimizes the CW size based on the following Table 1 (0 indicates a collision and 1 indicates a successful transmission without collision). In this study, we utilize two parameters x and y, that are used to update CW value. We check the channel and if the packet lost rate is increased because of channel error or collision, we increase the CW size for decreasing the packet lost and when the packet lost rate of the channel is decreased we decrease the CW size slowly for increasing the throughput. The CS (Channel State) is three elements array that is updated upon each transmission trial, i.e. each time the station transmits the packet successfully and receives the acknowledgement
(ACK for data and CTS for RTS packets) or when the packet becomes collide because of channel error or collision When we store the new channel state, the oldest channel state in the CS array is removed and the remaining stored states are shifted to the left.

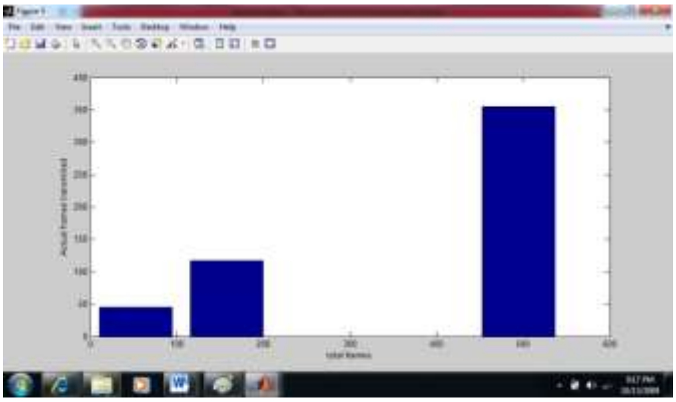
SIMULATION PARAMETERS:

Parameter	Work done by Ali Balador	Thesis work
Number of stations	50	10,15,30
Simulation time	600	2,0.2,0.4
Frame Size	512	200,80,20
Channel	AWGN	AWGN
Time Scale for random motion	0-20	0-10
Range of each station	250	6,10,6

RESULT:







I. CONCLUSIONS

This chapter discusses the overall scenario of the thesis and presents the future work which can be taken in the near future for further developments. OFDM is a promising technique for wireless communication systems although it has some drawbacks which are given below:

1. High PAPR
2. Frequency offset

High PAPR is one of the major problems of OFDM system. There are several techniques to reduce the PAPR in OFDM transmission system. All PAPR reduction techniques have some advantages and disadvantages. These PAPR reduction techniques should be chosen carefully for getting the desirable minimum PAPR. All PAPR reduction techniques are based on particular situation of system. This section describes and summarizes several techniques of PAPR and proposes repeated clipping and frequency domain filtering technique which is the best solution for PAPR. If considered the peak to average power ratio problem which becomes hindrance for higher number of subcarriers it is very important from the technical context that complementary cumulative distribution function is a better way to deal with the problem in a graphical format. The situation has enlarged in the thesis and is based on the modulation technique which is used in 3GPP systems for a particular bandwidth. Another significant improvement that has been observed is the 6-7dBs reduction which is observed in our results.

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